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ABSTRACT

The extent of the direct sources of economic stimulus by Georgia State University in Atlanta is estimated. The initial sources of positive economic impact are the local purchases by the university, the payroll spending of its faculty and staff, and spending by students drawn to the local area by the university. This study used techniques developed in similar inquiries at other postsecondary educational institutions. Since the initial expenditures generate additional income in the local area, the university's total economic impact is some multiple of the direct expenditures. This study also examines several techniques commonly used to calculate this local multiplier. The study complements the American Council on Education's guide, "Estimating the Impact of a College or University on the Local Economy" (1971). Whereas the guidebook focuses on estimating the university's initial spending impact, this study is a handbook for the actual calculation of specific multiplier values for the local community under investigation. (Author/LBH)

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A REVIEW OF ECONOMIC MULTIPLIERS FOR POST - SECONDARY INSTITUTIONS WITH SELECTED MODELS APPLIED TO GEORGIA STATE UNIVERSITY

by

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Report No. 77-5

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ABSTRACT

In the course of pursuing its primary educational and cultural aims, Georgia State University provides the Atlanta area with a substantial dividend of jobs and income. The initial sources of this positive economic impact are the local purchases by the university, the payroll spending of its faculty and staff, and spending by students drawn to the local area by the university.

This study estimates the extent of these direct sources of economic stimulus using techniques developed in similar inquiries at other post-secondary educational institutions. However, since these initial expenditures generate additional income in the local area, the university's total economic impact is some multiple of the direct expenditures. Consequently, this study also examines several techniques commonly used to calculate this local multiplier.

Although the three multiplier models are conceptually similar, one appears particularly relevant because it avoids the simplification of the highly aggregated model, yet avoids the data requirements of a completely disaggregated input-output model. The model is especially useful when adapted for Atlanta by employing specifically local value added estimates. This adapted version of the model produces a spending multiplier of 1.48.

The study found that the initial sources of economic stimulus totaled $82,531,290 for fiscal 1976. The figure is conservative since it omits spending by part-time employees and most part-time students. Using the 1.48 multiplier value, the estimate of Georgia State University's total spending impact on the 15-county Atlanta metropolitan area is $122,146,309. The tabular presentation lends itself to periodic updating of the actual dollar estimates.

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I. Introduction

The university plays many roles in the community in addition to its intended purpose. Incidental to its primary aims of educating young people and extending the boundaries of existing knowledge, the university also broadens the local social and political environment and, simultaneously, provides jobs and considerable income.

Interest in estimating this latter economic impact of universities and other non-profit institutions has surged in the past five to ten years. Much of this interest reflects an increase in community concern for possible undesirable fiscal effects that these institutions might have on the local area. Concern about the increase in locally provided public services necessitated by the presence of such facilities, coupled with their tax exempt status, is a typical factor.

Economic impact studies became the vehicle to promote the positive attributes of nonprofit institutions for the local area. In the case of universities, the relatively narrow emphasis of economic benefits results from the difficulty in translating long-run benefits such as expanded cultural activity and improved human resources into concrete measures. Conversely, the university's immediate contribution to the community in terms of new employment and income can be empirically examined.

The present study assesses several methods of estimating this single yet substantial economic dimension of Georgia State University's contribution to the Atlanta metropolitan area.

II. Purpose

The purpose of this study is to identify successful estimating techniques developed by previous studies of the local spending impact of post-secondary educational institutions. The eventual purpose is to use these techniques to give interested members of the Atlanta community a clear picture of the sizeable contribution the university makes to Atlanta in the way of jobs and income.

This immediate and tangible impact on Atlanta flows from three direct spending sources associated with Georgia State University. The first of these is the direct purchase of goods and services needed for the university's day to day operations. The second is the spending patterns of the university's faculty and administrative staff. And the third primary channel of economic impact is the spending patterns of the university's student body. While all institutions affect the local economy by direct purchases and payroll expenditures, this third channel--student spending--is unique to post-secondary educational institutions.

These primary channels of direct spending, although substantial, do not give a complete picture, however. Because of the interdependence of a high-consumption mass-production economy, every dollar of final good purchase sets in motion a flow of income to the chain of activity providing this final purchase. Thus, the university's total economic impact on Atlanta is some multiple of its initial, direct channels of spending. The study examines several ways to estimate this secondary impact. The study also establishes standard methods of computing these multipliers so that the university's total spending impact may be estimated on a timely basis at future dates.

III. Review of the Literature

Economic impact studies of colleges and universities first appeared in the mid-1960's. The attached table summarizes the contributions of thirteen such studies published from 1964 to 1973. The list is representative and by no means exhaustive. In general, each study displays an increasing level of sophistication.

A. Use of Economic Base Analysis

From the initial study on, all have regarded the university as an "export" sector of the local economy. This is because most of a university's income and most of its students' income originates outside the community. To the extent that this non-local source of funds is spent locally, the university provides community income very much like a factory exporting manufactured goods to other areas. Goods and services are sold to outsiders, even though the sale takes place locally. Thus the university "exports" educational services in much the same manner as a Florida resort exports services to winter visitors.

All of the studies estimate the aggregate demand for goods and services in the community resulting directly from expenditures by the university and its faculty and students. The Husson College Study (1967), though, is important since it was the first to use economic analysis to measure the secondary spending generated by the university's initial or direct spending. The concept introduced was economic base theory and the regional multiplier.

The underlying idea of economic base theory is regional specialization. A prominent characteristic of advanced economies is the division of labor and a corresponding degree of specialization. Great increases in productivity result when each participant in the economy concentrates his productive energy in a single activity where he has a natural or trained ability. One

TABLE 1

Summary Characteristics of Previous Impact Studies

Institution and Year	Major Contribution	Major Shortcoming	Use of a Multiplier
Univ of Bridgeport (1964)	Recognizes the "export" nature of college services	Considers only direct expenditures of university	No
Northern Michigan (1965)	Disaggregates university spending by types of goods	Considers only direct expenditures of university	No
Husson College (1967)	First use of multiplier to estimate indirect (secondary) spending	Derivation of multiplier not specific	Yes (2.0)
Univ of Colorado (1968)	Considers Input-Output Analysis but rejects as too costly	Ignores indirect effects of student spending	Yes (1.37)
Univ of Connecticut (1969)	Recognizes cyclical stability of university employment	No report of survey results	No
Univ of Florida (1970)	Justifies all univ. employment as basic. Develops method to determine what portion of student spending is basic (equivalent to univ. employment)	Basic employee equivalents of student spending are biased upward	Yes (1.4)
Wisconsin State Univ (1970)	Estimates future impact based on enrollment projections	Derivation of multiplier not specific	Yes (2.0-2.3)
Univ of Alabama (1971)	Illustrates upward bias of aggregate employment multipliers	Unusually high multiplier resulting from aggregate approach	Yes (4.35)
Idaho State Univ (1971)	First attempt to disaggregate student spending	Sample design led to considerable bias	No
Eastern Kentucky Univ (1971)	First use of student spending diaries	Derivation of multiplier not specific	Yes (1.75)
Univ of Pittsburgh (1972)	Comprehensive data collection	No independent estimate of multiplier	Yes (2.0)
Georgia State Univ (1973)	Uses a dynamic employment multiplier	Multiplier appears high in relation to previous studies	Yes (4.04)
Kent State Univ (1973)	Specific calculation of university sector multiplier	Assumes university multiplier and service sector multiplier are same	Yes (1.09)

consequence, though, is a high degree of interdependence. Specialized production activity is dependent on other specialized processes for inputs at their own stage of production. Similarly, their output is necessary for the next higher level of production leading toward final consumption in the consumer sector.

Likewise, geographic areas contribute to increased productivity through specialization. The specialization may result from some indigenous talent of the local population, an endowment of natural resources such as soil or minerals, or from a location that has special relevance to a market area or that serves as a transportation center or transfer point, say from water to rail or other land transportation.

An area's economic base consists of these specialized activities that produce for a demand that exceeds local consumption, that is, activities that involve sales to firms located elsewhere.[1] Such activities produce an inflow of money income from non-local sources. The non-local income then makes its way as wages and purchases into local trade and service activity. A sector of economic activity is basic, then, in the sense that other local income streams depend upon its productivity. It is because base sectors produce for non-local demands that they are also called export sectors. All other sectors are "service" or "local" activity because their output is consumed within the area.

B. Aggregate Multipliers Computed from Location Quotients (Model 1)

The export nature of base sectors makes their identity quantifiably possible. It is assumed that local consumption approximates the national or state average. Therefore, any sector producing more than the average is

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[1] See "Location Theory and Regional Economic Growth," Douglas C. North, Journal of Political Economy, Vol. 63 (June 1955), pp. 243-258, and The Community Economic Base Study, Charles M. Tiebout, New York: Committee for Economic Development, 1962.

taken to be producing for a non-local or export demand. Base sectors, then, are those with employment or income proportionately greater than the national or state average. For example, in 1973 about 10.7 percent of Atlanta's total employment was engaged in wholesale trade, compared with a statewide average of about 8.2 percent (see Table 2). The ratio of Atlanta's to Georgia's employment in this sector was 10.7 to 8.2 or 1.30. This means Atlanta's wholesale trade employment is over one and one-quarter times as great as the state average, making the metropolitan area relatively specialized in that sector.

This ratio of local to statewide employment is called a "location quotient." A value of one shows that a sector just matches the state average; a quotient greater than one pinpoints a sector of greater-than-state-average economic activity, or a base sector. Atlanta's base sectors are construction, transportation and utilities, wholesale trade, retail trade, finance and services (including educational institutions).

Increased spending in these sectors results in secondary rounds of spending in the "local" sectors. Thus an additional dollar spent by Georgia State University will generate total spending in excess of this amount or by some multiple of the initial spending. This assessment of the secondary impact of spending is called the multiplier. If one dollar of new spending by a base sector induces an additional outlay of 50 cents, the total impact is $1.50, so the multiplier in this case would be 1.5.

After total area employment is allocated between export and service activities, several different methods may be used to calculate the employment multipler (see Appendix B). The simple multiplier is merely the ratio between total employment (T) and export employment (X), or $m = \frac{T}{X}$. In the case of Atlanta for 1973 data, $m = \frac{641,578}{496,202} = 1.29$. An expenditure multiplier calculated in the same manner, though using taxable payroll data, is 1.34.

Table 2

Atlanta SMSA
Employment Specialization
1973 Percent Distribution

Employment Sector	(1) Atlanta	(2) Georgia	Location Quotient (1) ÷ (2)
Agriculture	0.3	0.5	.60
Mining	0.1	0.5	.20
Construction	8.2	7.7	1.06 *
Manufacturing	20.8	33.6	.62
Transportation and Public Utilities	9.5	7.0	1.36 *
Wholesale Trade	10.7	8.2	1.30 *
Retail Trade	20.9	19.9	1.05 *
Finance	8.9	6.5	1.37 *
Services	19.2	15.5	1.24 *
Unclassified	1.4	0.7	--
TOTAL	100.0	100.0	

*Quotient greater than one designates an economic base or "export" sector. See Appendix A for computation.

That is, every dollar of direct expenditure by Georgia State University produces a $1.34 increase in total income in the Atlanta area.

As the size of the base sectors may not be stable from year to year, another estimate can be obtained from the ratio of the change in total employment (ΔT) and the change in export employment (ΔX) between two periods or $m = \frac{\Delta T}{\Delta X}$. In the case of Atlanta for 1972-73 data, $m = \frac{81,600}{56,900}$ = 1.43. The income multiplier for the same period is 1.35.

The multiplier technique drawing on location quotients is a useful tool, especially in view of the relative ease of computation. Nevertheless, there are several reservations which should color the interpretation of such multipliers. Service employment may increase independently of changes in export jobs. Unusual increases in real wages or unusual expansion of defense projects migh produce such a change. Also, growth in service sectors may be viewed as a prerequisite for further expansion of the export sectors. Newly locating industries often require minimum levels of local service support. For these reasons, changes in export employment may not accurately predict changes in service employment. In general, though, the smaller the area studied, the more important is the role of exports and the easier it is to adjust for particular local circumstances.[2]

C. Rejection of Input-Output Analysis

The University of Colorado study (1968) sought to overcome the limitations of base sector analysis by using an input-output multiplier. Whereas the export base approach considers sectoral interdependence only between the aggregated export sectors and the aggregated service sectors, input-output analysis brings out the interdependence that exists among all sectors. In

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[2]S. J. Weiss and E. C. Gooding, "Estimation of Differential Employment Multipliers in a Small Regional Economy," Federal Reserve Bank of Boston, 1966, p. 13.

the aggregate export base approach, all sectors are assumed to have identical spending patterns. However, by calculating the input requirements of each sector, the inter-industry multiplier effects of a change in any category of final demand can be determined for all sectors. Moreover, the input-output analysis can determine induced effects of changes in household expenditures.[3]

In short, an input-output model is far more comprehensive. It is, unfortunately, far more time-consuming considering that data are required from every individual sector. Very often such data are unavailable for any geographic area smaller than an entire state or region. This circumstance together with the mathematical identity of the aggregate multipliers derived from the export-base model and the input-output model, has led to the reliance of subsequent studies on the export-base approach.[4]

D. Student Spending Viewed as Equivalent to Basic Employment

Because of the expense of preparing the basic transactions tables needed for an input-output analysis, the University of Florida study (1970) adopted the export-base approach. An initial difficulty with this technique lies in properly classifying basic (export) and service industries.

This study examined the objection that the number of university employees attributed to the base sector should be limited to the ratio of funds from non-local sources to total university funds. For instance, if eighty percent of the university's funds come from non-local sources, only eighty percent of the university's employment may be considered basic. On the other hand,

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[3]For a simple explanation of the input-output technique, see Werner Z. Hirsch, Urban Economic Analysis (New York: McGraw-Hill, 1973).

[4]R. Bruce Billings, "The Mathematical Identity of the Multipliers Derived From the Economic Base Model and the Input-Output Model," Journal of Regional Science, December, 1969, pp. 471-473. See also S. J. Kim, "Multiplier Theories and Their Applications to Regional Science," unpublished Ph.D. dissertation, University of Pennsylvania, 1966.

the study points out, if local expenditures for education would be spent elsewhere in the absence of the university, then local educational services represent a decrease in the community's imports (import substitution). Thus, all university employment may be classified as basic.

The study also introduces a method for determining what proportion of student expenditures may be considered basic, or equivalent in its impact to direct university employment. The study's method of computing these "employee equivalents," i.e., the number of local full-time jobs directly supported by student spending, is upwardly biased, however. This is because items students purchase are not produced entirely within the local economy. Wilson and Raymond corrected the method of computation in 1973.[5] A more accurate estimate is obtained by multiplying the amount of total student spending in each sector, i.e., rent, food, etc., by the local sales per employee ratio for the respective sector. (See Appendix E-2, "Calculation of Employee Equivalent.")

E. Sample Design for Student and Faculty/Staff Spending Surveys

The Idaho State University study (1971) estimated the level of student spending by surveying entire class sections selected randomly. Previous studies had drawn a random sample directly from the entire student body. This study raised the question of correct sample design for the spending surveys. Wilson and Raymond (1973) suggest that a proportional stratified sample produces a less biased estimate of the population's spending than other methods. (See Appendix C-3, "Estimation of Student Spending.")

F. Local Value Added Multipliers (Model 2)

As indicated above, the export-base multiplier technique drawing on location quotients has the drawback of using a single multiplier for the entire community. It is quite possible that the separate sectors of the basic portion of the local economy may have different spending patterns.

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[5] J. H. Wilson and R. Raymond, "Economic Impact of a University on the Local Community," Annals of Regional Science, December, 1973, p. 137.

If this is the case, each sector would then have different initial income and employment effects. One way to account for these sectoral differences, as well as service sector differences, is to use an input-output technique of computing interindustry multipliers for all sectors. This procedure, though, is viewed as impractical for small area studies.

The Kent State study (1973) suggests computing a separate multiplier at least for the university portion of the export base. While not so comprehensive as an array of input-output multipliers, the approach appears to produce an assessment of spending impact more closely tailored to the university's spending pattern than does the aggregated export-base multiplier.

The multiplier tailored to the university sector may be calculated from the local value added for each category of university employee spending. The readily available local payroll-to-sales ratio for each spending category is used as a proxy for value added. (See Appendix E-3, "Calculation of Multipliers Using Value Added by Employee Spending")

Although the model computes the initial local spending impact peculiar to the university, the model retains a drawback similar to the first aggregated model: subsequent respending rounds by the service sector are presumed to have the same pattern. In Model 1, the common respending pattern is that of the aggregated base sectors; in Model 2, the common respending pattern is that of university employees.

G. Differential Expenditure Multipliers (Model 3)

As seen in section F, although value-added multipliers are based more specifically on the university's expenditure pattern than are the aggregate location quotient multipliers, the method assumes that the local service sector respending pattern will be the same as the university's expenditure pattern. Since this coincidence is no more likely than the first model's coincidence of all base sector patterns, the method can be further developed.

S. R. Breslar[6] recognizes the distinction between the initial spending pattern of the individual export sector (the university) and the respending pattern of local consumers.

The limiting case of this type of disaggregation is the input-output model which uses separate spending patterns for every sector. The Breslar model (Model 3) represents a happy medium by recognizing that while the initial spending impact of a university may differ substantially from the initial impact of, say, an automobile assembly plant, the induced respending by local consumers may be more similar and thus more reliably aggregated.

The third model estimates the initial spending impact separately, as does Model 2, though the computation is based on the pattern of university purchases rather than on university employee spending patterns. Also, the value-added figures are taken from a national average rather than calculated from local payroll/sales data.

The model then estimates the aggregate respending ratio on the basis of general retail purchase value-added. This approach accounts for large variations in initial spending patterns of base sectors, while avoiding the immense data requirements of a full input-output model to estimate the respending (or induced spending) ratio. The final multiplier in this model is a ratio of the value added by initial university spending and the value added by induced consumer spending. (See Appendix F-2, "Computation of a Differential Expenditure Multiplier")

H. Resolution of Methodological Problems

Early studies estimating the impact of a university on the local economy supplied simple descriptive summaries of direct university employment and student spending. A later group of studies (1967-73) applied the concepts

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[6] S. R. Breslar, "Multiplier for a Public Program", unpublished dissertation, Georgia State University, 1974.

used in economic base analysis to the situation of the university. However, these more sophisticated studies typically developed economic base multipliers and sampling techniques that overestimated the university's impact on secondary spending.

Such overestimation can be corrected:

(1) by use of a proportional stratified sample design for student and faculty spending surveys;

(2) by considering a portion of student spending as export (basic) income and computing "employee equivalents" (i.e., base sector employment) attributable to student spending; and

(3) by use of a local value-added concept in computing the local multiplier used to determine the secondary impact of direct university spending.

IV. Plan of the Study

The estimation of the university's economic impact proceeds in six distinct phases:

(1) Collection of direct university enrollment, payroll and spending data.

(2) Survey and estimation of student spending.

(3) Survey and estimation of faculty/staff spending.

(4) Calculation of the local multiplier.

(5) Calculation of employee equivalent of student spending.

(6) Computation of the university's total impact on local income and employment.

The Business Office provided state funds expenditure data for the fiscal year 1976. The data which was initially classified by university expense code, was regrouped to correspond to the Standard Industrial Classification used by the Department of Commerce. This was necessary because virtually all Department of Commerce local value-added and sales-payroll ratios are published only for the SIC code industry groups.

The Business Office also provided gross and net payroll figures for the fiscal year for full-time and part-time employees. The number of employees by category and the number of students by category came from the Office of Institutional Planning. (See Appendix G, "Initial University Data.")

The Office of Institutional Planning conducted a questionnaire survey of student spending patterns and of faculty/staff spending patterns. A random sample of the student body produced 1,210 complete responses and a 100 percent faculty/staff survey produced 1,108 complete responses. Population estimates were then calculated from these results. (See Appendices C-3 and D-3).

Next, three multipliers were calculated. Although different techniques were used, the underlying export-base concept is the same for all three. The

initial multiplier was estimated using the aggregated location quotient method (Appendix B). The other two multipliers are less aggregative and used the actual university expenditure data to determine local value added for the multiplier estimate. The first of these used value added by employee expenditures (Appendix E-3), and the second used value added by employee spending together with value added by direct university purchases (Appendix F-2).

Since the third model used national average value-added ratios, a fourth multiplier was computed using the same local value-added ratios as Model 2 (Appendix F-1a and Appendix F-2a).

The employee equivalent of student spending was next calculated in order to assess the university's impact on local employment. Finally, the total impact of the university's spending on local income and employment was calculated for each of the four multiplier values. These results are summarized in section V.

V. Results

The university's initial spending impact comes from three sources, local purchases by the university, local faculty/staff spending of the university payroll, and local spending by students whose activity in Atlanta is directly attributable to their enrollment at Georgia State University.

Local purchases during fiscal 1976 total $7,138,952. This amount is virtually the total of all purchases since the university is located in the regional wholesale supply center and very few purchases are made outside the area. Purely non-local initial purchases are limited to periodical subscriptions and some travel expenses. All local orders, of course, do not produce additional local income if the actual materials are manufactured elsewhere. The value-added multipliers account for this income leakage, however.

Annual local spending by faculty and staff members is estimated to be an average of $8,419.20. Total local spending by 2,221 full-time employees is, then, $18,698,599. There are an additional 1,084 part-time employees. Although their spending patterns are similar to full-time employees, their local purchases cannot be attributed entirely to the university as payroll records indicate that only $1,025,208 was paid out to part-time personnel. Most of their income, apparently, derives from other sources.

Annual local spending by students is estimated to be $6,455.44 on average. Since many students are professionally employed in Atlanta and are incidentally enrolled in Georgia State University on a part-time basis, all student spending is not directly attributable to the university. Forty-six percent of the student body, though, are living in the Atlanta area because of their enrollment in Georgia State University. Either they have moved to the area to attend this school, or they would have moved elsewhere to attend school if Georgia State University were not located in the Atlanta area. A total of 8,782 students fall in this category. Their spending is $56,693,739.

Total initial university spending from these three sources amounts to $82,531,290. The figure is conservative because it omits spending by part-time employees and most part-time students. To obtain the total local expenditure figure, this amount is increased by the local multiplier. Four multiplier estimates are used:

Model 1:	Aggregate Location Quotient Multiplier (Appendix B)	(1.34) x $82,531,290 =	$110,591,929
Model 2:	Value-Added Multiplier (Appendix E-3)	(1.22) x $82,531,290 =	$100,688,173
Model 3:	Differential Value-Added Multiplier (Appendix F-2)	(1.78) x $82,531,290 =	$146,905,696
Model 3a:	Model 3 with Model 2 Value-Added data (Appendix F-2a)	(1.48) x $82,531,290 =	$122,146,309

Total local employment is estimated similarly. Initial employment is 3,591, consisting of the 2,221 full-time employees plus the 1,370 initial jobs attributable to student spending (Appendix E-2). To obtain the total employment impact figure, this level is increased by the local multiplier. Using the estimator, 1.48 from Model 3a, a total of at least 5,315 jobs in the Atlanta area may be attributed to Georgia State University.

VI. SUMMARY AND CONCLUSION

During the 1960's and early 1970's, economic impact studies became the vehicle to promote the positive attributes of nonprofit institutions for their local areas. Post-secondary educational institutions were prominent among these. A series of studies appeared calling attention to the substantial dividend of jobs and income the university provides its local community in the course of pursuing its primary educational and cultural aims.

Succeeding studies resolved conceptual problems dealing with the manner in which university-related spending enters the local income stream. Three channels were identified--direct university purchases, the university payroll, and, peculiar to the case of educational institutions, spending by the student body. The series of studies also resolved problems related to accurate estimation of the extent that faculty and staff spend payroll funds locally and the amount students spend locally.

Developing accurate methods to estimate these channels of direct university-related spending did not complete the picture, however. Because of the interdependence of a high-consumption mass-production economy, every dollar of final product purchase sets in motion a flow of income to the chain of activity providing the final purchase. The university's total impact is thus some multiple of its initial direct spending.

Most of the studies approached the problem of multiplier estimation in a conceptually identical manner, although each sought to achieve an increasingly accurate method of calculation. All employed the concept of the community economic base whose initial income induces several rounds of additional local spending. The first type model drawn from this literature (Appendix B) views the amount of secondary spending simply as proportionate to the ratio of basic to total employment (or income). This aggregate

location quotient multiplier has the advantage of readily available data and ease of computation (as well as ease of intuitive understanding). The necessary simplifying assumptions, however, can lead to great overstatement of economic impact, especially in rapidly growing areas where the base sectors are shifting.

The second type model (Appendix E-3) is less aggregated than the first. It recognizes the more individual spending pattern of university employees. The income multiplier is computed from the local value-added of specific sectors in proportion to university employee spending in each of these sectors. The value-added figures are readily calculable in the form of payroll/sales data (Appendix E-1). However, even though the model computes the initial local spending impact peculiar to the university, it suffers the drawback that subsequent rounds of spending by all local persons are presumed to have the same pattern as university employees.

The third type model, a differential value-added multiplier (Appendix F-2), is a refinement of the second model. As the name indicates, two different multipliers come into play--an initial local spending ratio unique for university patterns, and a second local spending ratio for subsequent rounds of respending. These ratios are conceptually identical to Model 2, though the computation of the initial impact ratio is based on the pattern of university purchase expenditures rather than on employee spending patterns. Also, the value-added figures are taken from a national average rather than calculated from local payroll/sales data. This is an important numerical difference, as the national averages are much higher than the local averages, at least in the case of the Atlanta SMSA.

Not surprisingly, the three models produce different multipliers. Nonetheless, the values for the Atlanta area lie in a fairly narrow range of 1.22 to 1.78. As seen in Table 1, page 4, some studies have calculated

values as high as 4.35. As stressed above, all three models are conceptually the same. The greatest discrepancy in these calculated multiplier values appears to derive from the different local value-added figures used as initial data in the two value-added models. If the lower payroll/sales figures (value-added estimates) of Model 2 are used in Model 3 (Appendix F-1a), the latter's multiplier value falls from 1.78 to 1.48 (Appendix F-2a). The range of the models, using similar input data, then, narrows to 1.22 - 1.48. These multiplier values are within the 1.20 - 1.50 range that the American Council on Education recommends for university impact studies.[7]

In conclusion, Model 3 appears to be the most evolved of the export-base type models to date for use in estimating Georgia State University's economic impact on the Atlanta area. The model's major shortcoming is the use of national average value-added figures. This is easily corrected by using the local payroll/sales ratios developed in Model 2 (Model 3a).

As the initial university-related spending totaling $82,531,290 for fiscal 1976 is a conservative figure which omits spending by part-time employees and most part-time students, using Model 3a's multiplier 1.48 produces a reliable, in the sense of minimum, estimate of total spending impact on the 15-county Atlanta area. This figure is $122,146,309.

The same multiplier, together with Model 2's calculation of employee equivalents of student spending, attributes a total of 5,315 Atlanta jobs to Georgia State University's spending. Again, any error in the estimates of both the expenditure impact and employment impact are on the conservative side.

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[7] J. Caffery and H. Isaacs, Estimating the Impact of a College or University on the Local Economy, Washington, D.C.: American Council on Education, 1971, pp. 44-45.

APPENDICES

A. Computation of Location Quotient
B. Computation of Aggregate Multipliers from Location Quotients
C-1. Cover Letter - Student Survey
C-2. Student Spending Questionnaire
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D-1. Cover Letter - Faculty/Staff Survey
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E-1. Atlanta Retail Sales and Services
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G. Initial University Data

Appendix A

COMPUTATION OF LOCATION QUOTIENT
ATLANTA SMSA 1973

Employment Sector	Atlanta SMSA (1) Number of Employees*	Atlanta SMSA (2) Percent Distribution	Georgia** (3) Number of Employees*	Georgia** (4) Percent Distribution	(2) ÷ (4) Location Quotient
Agriculture	2,160	0.3%	6,579	0.5%	.60
Mining	893	0.1%	6,726	0.5%	.20
Construction	52,314	8.2%	110,831	7.7%	1.06
Manufacturing	133,602	20.8%	482,360	33.6%	.62
Transportation & Public Utilities	60,866	9.5%	100,544	7.0%	1.36
Wholesale Trade	68,934	10.7%	117,813	8.2%	1.30
Retail Trade	134,357	20.9%	285,547	19.9%	1.05
Finance	56,833	8.9%	93,117	6.5%	1.37
Services	122,898	19.2%	222,791	15.5%	1.24
Unclassified	8,721	1.4%	9,853	0.7%	
TOTAL	641,578	100%	1,436,161	100%	

*Source: County Business Patterns (Georgia), U. S. Department of Commerce, March 1973.

**Quotients may also be calculated using total U. S. employment distribution. This approach assumes local consumption follows the national average rather than the state average.

Appendix B

COMPUTATION OF AGGREGATE MULTIPLIERS FROM LOCATION QUOTIENTS

I. Simple Employment Multiplier (1973 data)

$$\text{multiplier} = \frac{\text{Total Employment}}{\text{Export Employment (sum of sectors with location quotients greater than 1.00)}} = \frac{641,578}{496,202} = 1.29$$

II. Simple Expenditure Multiplier (1973 data)

$$\text{multiplier} = \frac{\text{Total Payrolls}}{\text{Export Sectors' Payrolls}} = \frac{\$1,289 \text{ million}}{\$ \ 962 \text{ million}} = 1.34$$

III. Two-Period Employment Multiplier (1972-1973)

$$\text{multiplier} = \frac{\text{Change in Total Employment}}{\text{Change in Export Employment}} = \frac{81,600}{56,900} = 1.43$$

IV. Two-Period Expenditure Multiplier (1972-1973)

$$\text{multiplier} = \frac{\text{Change in Total Payrolls}}{\text{Change in Export Sectors' Payroll}} = \frac{\$210 \text{ million}}{\$156 \text{ million}} = 1.35$$

Appendix C-1

GEORGIA STATE UNIVERSITY
33 GILMER STREET, S. E. • ATLANTA, GEORGIA 30303

April 16, 1976

The Development Office, Office of Institutional Planning, and School of Business Administration are assessing Georgia State University's economic impact on the Atlanta metropolitan area. The impact study should give interested members of the Atlanta community a clearer picture of the considerable contribution of the university in the way of jobs and income to Atlanta.

One source of the impact of the university on local employment is the spending patterns of Georgia State students. Would you please help us identify these spending patterns by allotting about ten minutes of your class time toward the completion of a student questionnaire.

A representative of the Office of Institutional Planning will conduct the survey in your classroom. Please call Mr. John Williams at 658-2570 if you have questions. Thank you for your help.

Sincerely,

Ralph Beck
Assistant Vice President for Development

/pae

Please indicate when we may conduct the survey in your class week April 26-30:

Day	Time	Classroom & Building	Number of Students
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix C-2

STUDENT QUESTIONNAIRE

1. How long have you been living in the Atlanta area? _____ (years)

2. What year were you first enrolled as a G.S.U. student? _____

3. What is your current age? _____

4. Class: Freshman _____ Junior _____ Graduate _____
Sophomore _____ Senior _____ Other _____

5. Female _____ Male _____

6. Married _____ Single, Divorced, Widowed _____

7. Full-Time Student _____ Part-Time Student _____

8. G.S.U. location in Atlanta influenced your decision to live in the Atlanta area, _____ Greatly, _____ Somewhat, _____ Not at all.

9. What do you spend each quarter for tuition and fees? _____
Books and supplies? _____

10. Please estimate your average monthly expenditures:

	Within 15-Coun Atlanta Metro Area
Rent or house payment	$_____
Utilities (gas, lights, telephone, etc.)	_____
Food consumed at home & household items	_____
Eating Out (restaurants, hamburger stands, etc.)	_____
Entertainment (sports, concerts, movies, etc.)	_____
Automobile (payment, repairs, gas, insurance)	_____
Other Transportation (bus, carpooling, etc.)	_____
Clothing	_____
Personal Services (hair, laundry, repairs)	_____
Health Services (including insurance)	_____
Furniture & Appliances	_____
Other	_____

Appendix C-3

ESTIMATION OF STUDENT SPENDING (SPRING 1976)
STRATIFIED RANDOM SAMPLE*

		Percent Distribution						
		Male	Female	Freshman	Sophomore	Junior	Senior	Graduate
Student Population	(19,092)	49.4	50.6	14.3	12.6	15.3	19.3	38.4
Student Sample	(1,210)	47.6	52.3	9.1	11.0	20.4	23.3	34.9

Spending Category	Sample Annual Average	Weighted Annual Average†
Books	$ 166.04	$ 163.72
Housing	1691.52	1719.72
Utilities	424.32	431.04
Food and Household	1100.88	1110.48
Eating Out	439.68	439.92
Entertainment	307.80	306.00
Automobile	962.28	960.60
Other Transportation	68.76	64.68
Clothing	371.88	372.72
Personal Services	187.20	183.60
Health Services	284.40	282.48
Furniture	133.80	137.16
Other	281.64	283.32
TOTAL	$6420.20	$6455.44

*Reference: Wonnacott, T. H. and R. J. Wonnacott, Introductory Statistics for Business and Economics, John Wiley and Sons, 1972, p. 529

†Weighting factors are the ratios of total population enrollment for each class to the total for all classes, i.e., 14.3% for freshmen, 12.6% for sophomores, etc. Factors are based on class rather than sex because the deviation of the population and sample distribution is greater by class.

GEORGIA STATE UNIVERSITY
33 GILMER STREET, S. E. • ATLANTA, GEORGIA 30303

April 16, 1976

MEMORANDUM TO: Faculty and Administrative Staff

At the Provost's direction, the Development Office, Office of Institutional Planning, and School of Business Administration are assessing Georgia State University's economic impact on the Atlanta metropolitan area. The impact study should give interested members of the Atlanta community a clearer picture of the considerable contribution of the university in the way of jobs and income to Atlanta.

One source of the university's impact on local employment is the spending patterns of the faculty and administrative staff. Would you please help us identify these patterns by completing the attached questionnaire. Procedures have been adopted which will insure that personal anonymity is maintained. There is no interest in identifying individuals or the spending habits of particular people.

You may find that consultation with other members of the household will be helpful in estimating some of the values requested. Even a rough approximation will be helpful in the overall estimation of these impacts.

Thank you for your cooperation. The questionnaires can be returned through campus mail.

Sincerely,

Ralph Beck
Assistant Vice President for Development
Chairman, Economic Impact Study Committee

/pae
Enclosures

Appendix D-2

FACULTY/STAFF QUESTIONNAIRE

The following items are intended to help estimate the economic impact of Georgia State University on the Atlanta metropolitan area.

A. What is your primary employment status at Georgia State University?

_____Full-time faculty
_____Part-time faculty
_____Full-time staff
_____Part-time staff

B. In what type of housing do you reside?

_____Rent
_____Own home

C. What is the zip code of your current address? _____

Please estimate your average monthly expenditures:

D. Rent or house payment (include condo. maintenance fee) $_____
E. Utilities (water, gas, lights, telephone) _____
F. Food consumed at home & household items _____
G. Eating out (restaurants & fast-food establishments) _____
H. Entertainment (theatre, sports, concerts, etc.) _____
I. Automobile (payments, repairs, gas, insurance) _____
J. Other transportation (bus, carpooling, etc.) _____
K. Clothing _____
L. Personal services (laundry, hair, repairs) _____
M. Health services (including insurance) _____
N. Furniture and appliances _____
O. Other _____

PLEASE RETURN TO OFFICE OF INSTITUTIONAL PLANNING VIA INTER-OFFICE MAIL

Appendix D-3

ESTIMATION OF FACULTY/STAFF SPENDING (SPRING 1976)
STRATIFIED RANDOM SAMPLE

		Percent Distribution			
		Full-Time Faculty	Part-Time Faculty	Full-Time Staff	Part-Time Staff
Population	(3305)	23.9	8.2	33.3	34.5
Sample	(1108)	38.8	6.5	38.8	15.9

Spending Category	Sample Annual Average	Weighted Annual Average*
Housing	$2523.00	$2280.96
Utilities	717.36	627.96
Food and Household	1794.12	1576.68
Eating Out	555.36	513.72
Entertainment	307.80	288.24
Automobile	1205.04	1052.64
Other Transportation	75.00	75.48
Clothing	501.84	391.80
Personal Service	280.32	244.56
Health Services	524.64	429.96
Furniture	318.36	246.24
Other	801.84	690.96
	$9606.68	$8419.20

*Weighting factors are the ratios of faculty/staff population in each category to the population total, i.e., 23.9% for full-time faculty, 8.2% for part-time faculty, etc.

Appendix E-1

ATLANTA SMSA

RETAIL SALES AND SERVICES

(1) Sector	(2) SIC Code	(3) Sales* (000's)	(4) Payroll* (000's)	(5) Employees	(6) Sales/Employee (3) ÷ (5)	(7) Payroll/Sales (4) ÷ (3)
Books and supplies	594	$ 10,268	$ 1,455	200	$51,340	.142
Food and Household	540	735,269	58,610	9,469	77,650	.080
Eating Out	581	251,402	62,450	14,056	17,886	.248
Entertainment	780 & 790	120,562	25,922	2,860	42,155	.215
Automobile	554-5	1,006,574	98,729	11,622	86,609	.098
Clothing	560	183,999	28,069	4,594	40,052	.153
Personal Services	720	146,643	58,869	9,794	14,973	.401
Health Services	591	127,780	19,908	3,019	42,325	.156
Furniture and Appliances	570	146,237	21,652	2,434	60,081	.148
Miscellaneous	590	313,965	37,091	4,743	66,195	.118
Rent †					54,913	.219
Utilities †					15,115	.397

† J. Wilson, "Economic Impact of a University on the Local Economy," unpublished dissertation, Kent State University, pp. 148 & 153.

* Census of Business, U. S. Department of Commerce 1967, converted to 1976 prices with index 167 (1967 = 100). See Federal Reserve Bulletin, April 1976, Table A 53.

Appendix E-2

CALCULATION OF EMPLOYEE EQUIVALENT

(1) Student Spending Category	(2) $ Annual Amount of Local Purchases*	(3) Local Sales/Employee†	(4) Employee Equivalent (2) ÷ (3)
Books & Supplies	$ 1,437,789	$51,340	28.0
Rent	15,102,581	54,913	275.0
Utilities	3,785,393	15,115	250.4
Food & Household	9,752,235	77,650	125.6
Eating Out	3,863,377	17,886	216.0
Entertainment	2,687,292	42,155	63.8
Automobile	8,435,989	86,609	97.4
Clothing	3,273,227	40,052	81.7
Personal Services	1,612,375	14,973	107.7
Health Services	2,480,739	42,325	58.6
Furniture & Appliances	1,204,539	60,081	20.0
Other	3,056,136	66,195	46.2
			1370.4 (University Employment Equivalent generated by local student spending)

*Data from Student Spending Survey. Total for only 46% of student population (8782) drawn to Atlanta by Georgia State University.

†Values from Appendix E-1, column 6.

Reference: J. H. Wilson and R. Raymond, "Economic Impact of a University on the Local Community," Annals of Regional Science, (vol. 7) December 1973, p. 141.

Appendix E-3

CALCULATION OF MULTIPLIER USING VALUE ADDED
BY EMPLOYEE SPENDING

(1) Spending Category	(2) Local Purchases by 2,599 Basic Employees*	(3) Percent of Total Purchases	(4) Local Payroll/Sales†	(5) Local Value Added (3) x (4)
Rent	$5,928,215	.271	.219	.059
Utilities	1,632,068	.075	.397	.030
Food and Household	4,097,791	.187	.080	.015
Eating Out	1,335,158	.061	.248	.015
Entertainment	749,135	.034	.215	.007
Automobile	2,735,811	.125	.098	.012
Clothing	1,018,288	.047	.153	.007
Personal Services	635,611	.029	.401	.012
Health Services	1,117,466	.051	.156	.008
Furniture and Appliances	639,977	.029	.148	.004
Other	1,991,978	.091	.118	.011
TOTAL	$21,881,498	1.00		S = .180

$$\text{Multiplier} = \frac{1}{1 - S} = \frac{1}{.820} = 1.22$$

Total Impact = (Local University Purchases + Faculty/Staff Spending + Student Spending) x 1.22

*Total of spending by full-time employees (1893) plus one half of part-time employees (706).
†Values from Appendix E-1.
Reference: J. H. Wilson and R. Raymond, "Economic Impact of a University on the Local Community," Annals of Regional Science (vol. 7) December 1973, p. 137.

Appendix F-1

CALCULATION OF INITIAL IMPACT BY UNIVERSITY PURCHASES FROM LOCAL AREA*
USING NATIONAL INPUT - OUTPUT RATIOS

(1) Item	(2) Amount of Local Purchase	(3) Industry I/O Code	(4) Value Added Ratio†	(5) Value Added Amount (2) x (4)
Employee Travel and Benefits	$ 320,977	69	.733	$ 235,276
Taxes and Utilities	1,506,241	68	.468	704,921
Trade Purchases (Wholesale and Retail)	3,198,829	69	.733	2,344,741
Finance and Insurance	44,081	70	.550	24,244
Rental	750,617	71	.734	550,953
Repair Services	611,436	72	.639	390,708
Business Services	668,156	73	.489	326,728
Vehicle Repair and Service	20,516	75	.591	12,125
Other	18,119	69	.733	13,281
TOTAL	$7,138,952			$4,602,977

*Adapted from S. R. Bresler, "Multiplier for a Public Program," unpublished dissertation, Georgia State University, 1974, pp. 35-37.
†Survey of Current Business, vol. 53 (4), April, 1973, p. 36. Sales-payroll ratios may also be used to estimate local value added. See Appendix F-1a.

Appendix F-1a

CALCULATION OF INITIAL IMPACT BY UNIVERSITY PURCHASES*
USING LOCAL VALUE-ADDED RATIOS

(1) Item	(2) Amount of Local Purchase	(3) Industry I/O Code	(4) Value Added Ratio†	(5) Value Added Amount (2) x (4)
Employee Travel and Benefits	$ 320,977	7000	.322	$ 103,355
Taxes and Utilities	1,506,241	--	.397	597,978
Trade Purchases (Wholesale and Retail)	3,198,829	5000	.133	425,444
Finance and Insurance	44,081	7300	.366	16,134
Rental	750,617	--	.219	164,385
Repair Services	611,436	7600	.372	227,454
Business Services	668,156	7300	.366	244,545
Vehicle Repair and Service	20,516	7500	.219	4,493
Other	18,119	5000	.133	2,410
TOTAL	$7,138,952			$1,786,198

*Adapted from S. R. Bresler, "Multiplier for a Public Program," unpublished dissertation, Georgia State University, 1974, pp. 35-37.

†Atlanta sales-payroll ratios are calculated from data presented in Census of Business, U.S. Department of Commerce 1967, vol. 5, pt. 1.

Appendix F-2

COMPUTATION OF A DIFFERENTIAL EXPENDITURE MULTIPLIER*

$$m = 1 + \frac{r}{1 - s}$$ where r = initial spending

s = re-spending ratio

A. Computation of r, the proportion of total university spending that is spent locally.

1. Local consumption by full-time employees (survey) $15,937,167 .
2. Gross payroll to full-time local employees $30,642,237 .
3. Portion of payroll spent locally (1) ÷ (2) = .520 .
   (Proxy for all local payroll spending)
4. Value added by university's local purchases (Appendix F-1) $4,602,977.
5. Initial local income generated by purchases (3) x (4) = $2,393,548.
6. Total initial local spending (1) + (5) = $18,330,715.
7. Total university spending (all purchases + 2) $37,781,189.
8. Ratio of initial local spending to total spending (6) ÷ (7) = .485.

B. Computation of s, secondary local spending induced by initial local spending.

9. Local value added by total local spending (6) x (.733†) = $13,436,414.
10. Induced local spending (9) x (3) = $6,986,935.
11. Ratio of induced local spending to initial local spending (10) ÷ (6) = .381.

C. Computation of multiplier.

12. 1.000 - (11) = .619.
13. (8) ÷ (12) = .784
14. 1.000 + (13) = 1.784.

*Adapted from S. R. Bresler, "Multiplier for a Public Program," unpublished dissertation, Georgia State University, 1974, pp. 33-46.

†Trade purchases value added, Appendix F-1, col. (4); Bresler, p. 44

Appendix F-2a

COMPUTATION OF A DIFFERENTIAL EXPENDITURE MULTIPLIER*
USING LOCAL VALUE ADDED

$$m = 1 + \frac{r}{1 - s}$$ where r = initial spending
s = re-spending ratio

A. Computation of r, the proportion of total university spending that is spent locally.

1. Local consumption by full-time employees (survey) $15,937,167.
2. Gross payroll to full-time local employees $30,642,237.
3. Portion of payroll spent locally (1) ÷ (2) = .520.
(Proxy for all local payroll spending)
4. Value added by university's local purchases (Appendix F-1) $1,786,198.
5. Initial local income generated by purchases (3) x (4) = $928,823.
6. Total initial local spending (1) + (5) = $16,865,990.
7. Total university spending (all purchases + 2) $37,781,189.
8. Ratio of initial local spending to total spending
(6) ÷ (7) = .446.

B. Computation of s, secondary local spending induced by initial local spending.

9. Local value added by total local spending (6) x (.133†) = $2,243,177.
10. Induced local spending (9) x (3) = $1,166,452.
11. Ratio of induced local spending to initial local spending
(10) ÷ (6) = .069.

C. Computation of multiplier.

12. 1.000 - (11) = .931.
13. (8) ÷ (12) = .479.
14. 1.000 + (13) = 1.479.

*Adapted from S. R. Bresler, "Multiplier for a Public Program", unpublished dissertation, Georgia State University, 1974, pp. 33-46.

†Trade purchases value added, Appendix F-1a, col. (4); Bresler, p. 44.

Appendix G

INITIAL UNIVERSITY DATA

1. Student Population (Spring Quarter, 1976)

	Male	Female	Total
Freshmen	1,209	1,527	2,736
Sophomore	1,179	1,220	2,399
Junior	1,604	1,326	2,930
Senior	2,066	1,626	3,692
Graduate	3,377	3,958	7,335
TOTAL	9,435	9,657	19,092

2. Faculty/Staff Population (5/31/76)

	Full-Time	Part-Time
Faculty	791	271
Staff	1,102	1,141
TOTAL	1,893	1,412

3. Total Local University Expenditures = $7,138,952

4. University Payroll for Fiscal Year 1976

Gross	$31,667,445	($30,642,237 full-time employees)
Federal Tax	(4,492,505)	
State Tax	(827,051)	
FICA	(1,319,393)	
Other Deductions	(3,115,765)	
TOTAL	$21,912,730	

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